

**THE SME GUIDE FOR REPORTING
EXPLORATION RESULTS, MINERAL RESOURCES,
AND MINERAL RESERVES**

(The 2005 SME Guide)

SUBMITTED BY:

**THE SEC RESERVES WORKING GROUP
THE RESOURCES AND RESERVES COMMITTEE**

TO:

**THE BOARD OF DIRECTORS
OF
THE SOCIETY FOR MINING, METALLURGY AND EXPLORATION, INC.**

**8307 SHAFFER PARKWAY
LITTLETON, COLORADO 80127
PHONE: (303) 973-9550
FAX: (303) 973-3845
E-MAIL: sme@smenet.org**

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Foreword

- i. The April 2005 SME Guide for Reporting Exploration Results, Mineral Resources, and Mineral Reserves (the 2005 SME Guide) has been adopted by the Society for Mining, Metallurgy, and Exploration, Inc. (SME) and is therefore strongly recommended to be used by members of this organization.
- ii. The Guide is recommended as a minimum standard for reporting Exploration Results, Mineral Resources and Mineral Reserves for public and private purposes. In terms of the Guide, a Public Report is a report on Exploration Results, Mineral Resources or Mineral Reserves prepared for the purpose of informing the general public.
- iii. In this Guide, important terms and their definitions are highlighted in **bold** text. The guidelines are written using regular font. Paragraphs with border on the left side and written in *italics* give directions on how to interpret definitions and guidelines.
- iv. THE UNITED STATES SECURITIES AND EXCHANGE COMMISSION (U.S. SEC) REGULATES THE REPORTING OF EXPLORATION RESULTS, RESOURCES AND RESERVES BY ORGANIZATIONS, INDIVIDUALS OR COMPANIES (“ENTITIES”) SUBJECT TO THE FILING AND REPORTING REQUIREMENTS OF THE U.S. SEC. DECISIONS AS TO WHEN AND WHAT INFORMATION SHOULD BE PUBLICLY REPORTED ARE THE SOLE RESPONSIBILITY OF THE ENTITY OWNING THE INFORMATION, AND ARE SUBJECT TO U.S. SEC RULES AND REGULATIONS. THESE RULES AND REGULATIONS VARY FROM TIME TO TIME, AND AT ANY GIVEN TIME MAY NOT BE CONSISTENT WITH THE CONTENT OF THIS GUIDE. THE ADVICE OF SECURITIES COUNSEL SHOULD BE SOUGHT IN PREPARING FILINGS FOR THE U.S. SEC OR OTHER SECURITIES REGULATORY AUTHORITIES, AND IN PREPARING OTHER PUBLIC DISCLOSURES.
- v. It is recognized that further review of the Guide will be required from time to time. Constructive suggestions are solicited from all users of this Guide. Comments should be sent directly to:

Chairman, Resources and Reserves Committee
Society for Mining, Metallurgy and Exploration, Inc.
8307 Shaffer Parkway
P.O. Box 277002
Littleton, CO 80127-7002
U.S.A.

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TABLE 1. Checklist of Assessment Criteria

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History

1. In 1988, at the request of members of the Society for Mining, Metallurgy, and Exploration (SME), Inc., the President of SME formed Working Party #79, Ore Reserve Definition, with the mission to develop guidelines for the public reporting of exploration results, resources, and reserves. A Subcommittee was appointed by the Working Party to draft these guidelines and submit recommendations to SME. The Subcommittee's recommendations were published by SME in the April 1991 issue of "Mining Engineering", and as a document entitled "A Guide for Reporting Exploration Information, Resources, and Reserves" (the SME Guide) in January 1992. Work continued on an ad-hoc basis until 1996, when Working Party #79 was renamed the SME Resources and Reserves Committee and became a standing committee.

In 1994, the Council of Mining and Metallurgical Institutions (CMMI) started a concerted international effort to create a set of international definitions for reporting mineral resources and mineral reserves. An ad-hoc International Definitions Group was formed, with representatives from mining and metallurgical institutions from the United States (SME), Australia (AusIMM), Canada (CIM), the United Kingdom (IMM) and South Africa (SAIMM). A major breakthrough came on October 18, 1997 when the CMMI International Definitions Group met in Denver, Colorado and reached a provisional agreement (the Denver Accord) on definitions of mineral resources and mineral reserves. Concurrently, and since 1992, the United Nations Economic Commission for Europe (UN-ECE) was developing an international framework classification for mineral resources and mineral reserves. Starting in October 1998, joint meetings were held in Geneva between the CMMI International Definitions Group and the UN-ECE Task Force, resulting in agreement to incorporate the CMMI definitions into the UN framework classification.

In 2002, the Combined Reserves International Reporting Standards Committee (CRIRSCO) was formed, replacing the CMMI International Definitions Group with the mission to continue coordination between member countries, of the development of international standards for the definition and reporting of exploration results, mineral resources and mineral reserves. Chile joined CRIRSCO and developed the first non-English reporting code which follows the international definitions.

The international resources and reserves definitions have been accepted as part of national reporting codes and guidelines by the regulating agencies of Australia (1989), South Africa (2000), Canada (2001), and Chile (2004).

2. The SME Guide, first published in 1992, was updated in 1999 when the requirement was introduced that the reporting of mineral resources and reserves be made by a Competent Person. The SME Guide was recommended to be used by members of SME. However, some key aspects of the SME Guide were not consistent with requirements of the U.S. Securities and Exchange Commissions (U.S. SEC) which are based on the SEC Industry Guide 7. While the SME Guide was accepted by a

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number of U.S. and international mining and consulting companies, its usefulness remained limited.

To resolve the differences between the SME Guide and the U.S. SEC rules and regulations, SME opened a dialogue with the U.S. SEC and started a renewed effort to better define the industry position with respect to a number of critical issues. In February 2004, SME formed a consortium of mining, consulting and financial auditing organizations known as the SEC Reserves Working Group (the Working Group), whose members formed the SME Resources and Reserves Committee. The Working Group recommendations were included in this Guide and submitted to the SEC for their consideration in April 2005. The most significant changes include improved definition of the terms Mineral Resources and its subdivisions (Measured, Indicated and Inferred Mineral Resources), and clarification of the technical, economic, legal and permitting requirements which must be satisfied before a reserve can be declared. A section has been added defining the commodity prices which can be used for reserve estimation and reporting, and how price sensitivity should be measured during periods of low prices. Documentation requirements are clarified, including the requirement for a Mineral Reserves Declaration Report. The role of the Competent Person is reemphasized.

Governing Principles

3. This Guide was written taking into account industry good practices and the mission of the U.S. Securities and Exchange Commission (SEC) which is to protect investors and maintain the integrity of the securities markets. All investors, whether large institutions or private individuals, should have access to certain basic facts about an investment prior to buying it. The SEC requires public companies to disclose meaningful financial and other information to the public, which provides a common pool of knowledge for all investors to use to judge for themselves if a company's securities are a good investment. Only through the steady flow of timely, comprehensive and accurate information can people make sound investment decisions. To meet the SEC's requirements for disclosure, a company must make available all information, whether it is positive or negative, that might be relevant to an investor's decision to buy, sell, or hold the security.

The main principles governing the development and application of this Guide are transparency, materiality and competence.

- **Transparency** requires that the reader of a public report is provided with sufficient information, the presentation of which is clear and unambiguous, so as to understand the report and not to be misled.
- **Materiality** requires that a public report contains all the relevant information which investors and their professional advisers would reasonably require, and reasonably expect to find in a public report, for the purpose of making a reasoned and balanced judgment regarding the exploration results, mineral resources or mineral reserves being reported.

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- **Competence** requires that the public report be based on work that is the responsibility of suitably qualified and experienced persons who are subject to an enforceable professional code of ethics and rules of conduct.

The following additional principles were also taken into account:

- **Consistency between Financial and Technical Reports:** Financial reports take into account mineral resources and mineral reserves and are based on assumptions concerning commodity prices, exchange rates, and other parameters of significance. To be clear and unambiguous technical and financial information should be published on a comparable basis.
- **Consistency between Financial Markets:** For global companies, transparency can only be achieved if information is reported on a consistent basis in all financial markets. Only then can the information supplied to all investors be identical, clear and unambiguous.

Scope

4. **Public reporting:** The Guide is recommended as a minimum standard for reporting Exploration Results, Mineral Resources and Mineral Reserves for public and private purposes. In terms of the Guide, a Public Report is a report on Exploration Results, Mineral Resources or Mineral Reserves, prepared for the purpose of informing the general public.

Public reports include, but are not limited to: company Annual Reports, quarterly reports, press releases, reports which the U.S. SEC requests companies to publish on a yearly, quarterly or other basis, and other reports. It is recommended that the Guide apply to the following reports if they have been prepared or are likely to be used for informing the general public: information memoranda, expert reports and technical papers reporting on Exploration Results, Mineral Resources or Mineral Reserves.

5. **Use of the Guide:** Public companies should provide all relevant and material information, necessary for an intelligent layman to make a reasonable and balanced assessment of the Exploration Results, Mineral Resource or Mineral Reserve being reported.

While every effort has been made within the Guide to cover most situations likely to be encountered in the reporting of Exploration Results, Mineral Resources and Mineral Reserves, there will inevitably be occasions when doubt exists as to the appropriate procedure to follow. In such cases, users of the Guide and those compiling reports under the Guide should be guided by its intent, which is to provide a minimum standard for reporting and to ensure that such reporting contains all information which investors and their professional advisers would reasonably require, and reasonably expect to find in the report, for the purpose of making a reasoned and balanced judgment regarding the Exploration Results, Mineral Resource or Mineral Reserve reported.

Table 1, included at the end of the Guide, supplies an outline of items that should be considered when evaluating a project. The importance of each item will vary with the project and it is recognized that, for some projects, other items may be relevant which are not on the list. The Table should be considered a guide to facilitate a rational and orderly approach to evaluation. However, the need remains for

exploration and mining professionals to make difficult decisions, such as the classification of material as a Mineral Resource or a Mineral Reserve. Decisions remain a matter of professional judgment based on knowledge, experience, and industry practices.

The relative importance of the items in Table 1 will vary with each project depending on the geological environment and technical constraints, as well as economic and legal conditions pertaining at the time of evaluation. When evaluating a project, the relative importance of each item should be weighed. All relevant information must be given careful consideration before deciding which information should be reported to the public.

Where a particular report addresses only some of the items in Table 1, the report should disclose its limited scope and should refer to other information required for a complete evaluation of the Exploration Results, Mineral Resource or Mineral Reserve being reported. While such limited scope reports are commonly prepared as part of the overall preparation of an evaluation, such reports may contain information warranting public disclosure independent of the results of other studies and the authors of such reports should be aware of their responsibilities with respect to public disclosure.

Public disclosure may be required of factors most likely to affect the accuracy of estimates made in the report. The authors of reports should both identify and evaluate these important factors within their reports.

For a variety of reasons, including the need for confidentiality, some data used to evaluate a project need not be made public. However, the public can reasonably assume that all necessary information is available to support public statements at the time they are made. Regulators including the SEC may require copies of all supporting documents on a confidential basis even if such documents are not made public.

Demonstrating feasibility of economic extraction is not required before reporting Exploration Results or Mineral Resources. However, particular attention should be given to all relevant information that increases or decreases the chances that the project will result in economic extraction. Demonstrating feasibility of economic extraction is required before reporting Mineral Reserves.

It is recognized that estimates of Exploration Results, Mineral Resources, and Mineral Reserves, being predictions of what will occur in the future based on imperfect knowledge of the present, are inherently forward-looking statements, and will be imprecise to some degree. It is also recognized that different individuals analyzing the same data may arrive at somewhat differing interpretations and conclusions. The fact that a Mineral Reserve estimate is misclassified or proven inaccurate at a later date, when additional information becomes available or economic conditions have changed, does not necessarily mean that the estimate was not made in good faith by a competent person taking into account the information available at the time. Statements concerning Exploration Results, Mineral Resources and Mineral Reserves must have a reasonable basis and be made in good faith.

Competence and Responsibility

6. Any Public Report concerning an entity's Exploration Results, Mineral Resources and Mineral Reserves is the responsibility of the entity's management. Any such report must be based on, and fairly reflect the information and supporting documentation prepared by a Competent Person or Persons, as defined below.

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An entity issuing a Public Report shall make publicly available on request the name(s) of the Competent Person or Persons, state whether the Competent Person is a full time employee of the entity, and, if not, name the Competent Person's employer and its relationship with the entity.

Issuance of the Public Report requires the written consent of the Competent Person or Persons as to the form and context in which it appears. The Competent Person must read and approve the entity's public disclosure of information prepared by the Competent Person, and the use of his/her name in connection with that disclosure.

The requirement for, and the naming of, a Competent Person is aimed at increasing the quality of the information being released and add to investors confidence. These guidelines only require that the name of the Competent Person be made available on request. However, whenever Exploration Results, Mineral Resources or Mineral Reserves are publicly reported, it is recommended that the name of the Competent Person be disclosed.

7. Documentation detailing Exploration Results, Mineral Resources and Mineral Reserves estimates, on which a Public Report on Exploration Results, Mineral Resources, and Mineral Reserves is based, must be prepared by, or under the direction of, and signed by, a Competent Person or Persons. If the Competent Person is an employee, officer, director or associate of a company whose principal business is the provision of engineering or geoscientific services, the documentation must also be signed by that company.
8. A '**Competent Person**' is a Member or Fellow of an approved institution in the U.S. with an enforceable code of ethics¹, or of a 'Recognized Overseas Professional Organization' ('ROPO') included in a list promulgated by the SME from time to time.

A Competent Person is an engineer, geoscientist or other mining professional who must have a minimum of five years experience which is relevant to the style of mineralization and type of deposit under consideration and to the activity which that person is undertaking.

If the Competent Person is preparing a report on Exploration Results, the relevant experience must be in exploration. If the Competent Person is estimating, or supervising the estimation of Mineral Resources, the relevant experience must be in the estimation, assessment and evaluation of Mineral Resources. If the Competent Person is estimating, or supervising the estimation of Mineral Reserves, the relevant experience must be in the estimation, assessment, and economic evaluation of Mineral Reserves.

¹ On February 27, 2005, SME approved the formation of a new class of Registered Members who will be subject to an enforceable code of ethics. SME will start accepting Registered Members not later than January 1, 2006. The Competent Person requirements will become fully effective for public reports submitted as of December 31, 2006.

The key qualifier in the definition of a Competent Person is the word 'relevant'. Determination of what constitutes relevant experience can be a difficult area and common sense has to be exercised. Different experience is required to evaluate coal, base metal, industrial mineral, iron ore, sand and gravel, or gold deposits. Other differences are less obvious. In estimating Mineral Resources for vein gold mineralization, experience in a high-nugget, vein-type mineralization such as tin, uranium etc. will probably be relevant whereas experience in (say) a low grade disseminated gold deposit may not be. To qualify as a Competent Person in the estimation of Mineral Reserves for alluvial gold deposits, considerable (probably at least five years) experience in the evaluation and economic extraction of this type of mineralization would be needed. This is due to the characteristics of gold in alluvial systems, the particle sizing of the host sediment, and the low grades involved. Experience with placer deposits containing minerals other than gold may not necessarily provide appropriate relevant experience.

The key word 'relevant' also means that it is not always necessary for a person to have five years experience in each and every type of deposit in order to act as a Competent Person if that person has relevant experience in other deposit types. For example, a person with (say) 20 years experience in estimating Mineral Resources for a variety of metalliferous hard-rock deposit types may not require as much as five years specific experience in (say) porphyry copper deposits in order to act as a Competent Person. Relevant experience in the other deposit types could count towards the experience in relation to porphyry copper deposits.

In addition to experience in the style of mineralization, a Competent Person taking responsibility for the compilation of Exploration Results or Mineral Resource estimates should have sufficient experience in the sampling and analytical techniques relevant to the deposit under consideration to be aware of problems which could affect the reliability of data. Some appreciation of extraction and processing techniques applicable to that deposit type may also be important.

9. Persons being called upon to act as Competent Persons should be clearly satisfied in their own minds that they could face their peers and demonstrate competence in the commodity, type of deposit and situation under consideration. If doubt exists, the person should either seek opinions from appropriately experienced colleagues or should decline to act as a Competent Person.

Estimation of Mineral Resources may be a team effort (for example, involving one person or team collecting the data and another person or team preparing the estimate). Estimation of Mineral Reserves is very commonly a team effort involving several disciplines. It is recommended that where there is a clear division of responsibility within a team, each Competent Person and his or her contribution should be identified, and responsibility accepted for that particular contribution. However, the definitions have been specifically written to allow an appropriate degree of latitude for companies to define the organizational structure in which they apply the role of the Competent Person. If only one Competent Person signs the Mineral Resource or Mineral Reserve documentation, that person is responsible and accountable for the whole of the documentation under the Code. It is important in this situation that the Competent Person accepting overall responsibility for a Mineral Resource or Mineral Reserve estimate and supporting documentation prepared in whole or in part by others, is satisfied, in its professional opinion, that the work of the other contributors is reliable.

A Competent Person may be an employee of the entity reporting Exploration Results, Mineral Resources or Mineral Reserves, or an independent consultant. When the Competent Person's recommendations are likely to have material consequences (such as development of a new mining or processing facility, or significant decreases or increases in reserves), it is recommended that these

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recommendations be independently reviewed before the recommendations are finalized. The independent reviewer should qualify as a Competent Person in the context of the project being reviewed.

10. Complaints made in respect of the professional work of a Competent Person will be dealt with under the disciplinary procedures of the professional organization to which the Competent Person belongs.
11. When a U.S.-listed company with overseas interests wishes to report overseas Exploration Results, Mineral Resource or Mineral Reserves, estimates prepared by a person who is not a member of an appropriate U.S. institution or a Recognized Overseas Professional Organization (ROPO), it is necessary for the company to nominate a Competent Person or Persons to take responsibility for the Exploration Results, Mineral Resources or Mineral Reserves estimate. The Competent Person or Persons undertaking this activity should appreciate that they are accepting full responsibility for the estimate and supporting documentation and should not treat the procedure merely as a 'rubber-stamping' exercise.

Rules, regulations or guidelines concerning the Competent Person differ from country to country. When Exploration Results, Mineral Resources or Mineral Reserves are reported in the United States or in countries other than the United States, it is the responsibility of the Competent Person and the entity making a public report to ensure that the applicable rules, regulations and guidelines are followed.

Reporting Terminology

12. Public reports dealing with Exploration Results, Mineral Resources and/or Mineral Reserves must only use the terms set out in Figure 1.

The term 'Modifying Factors' is defined to include mining, metallurgical, economic, marketing, legal, environmental, social and governmental factors

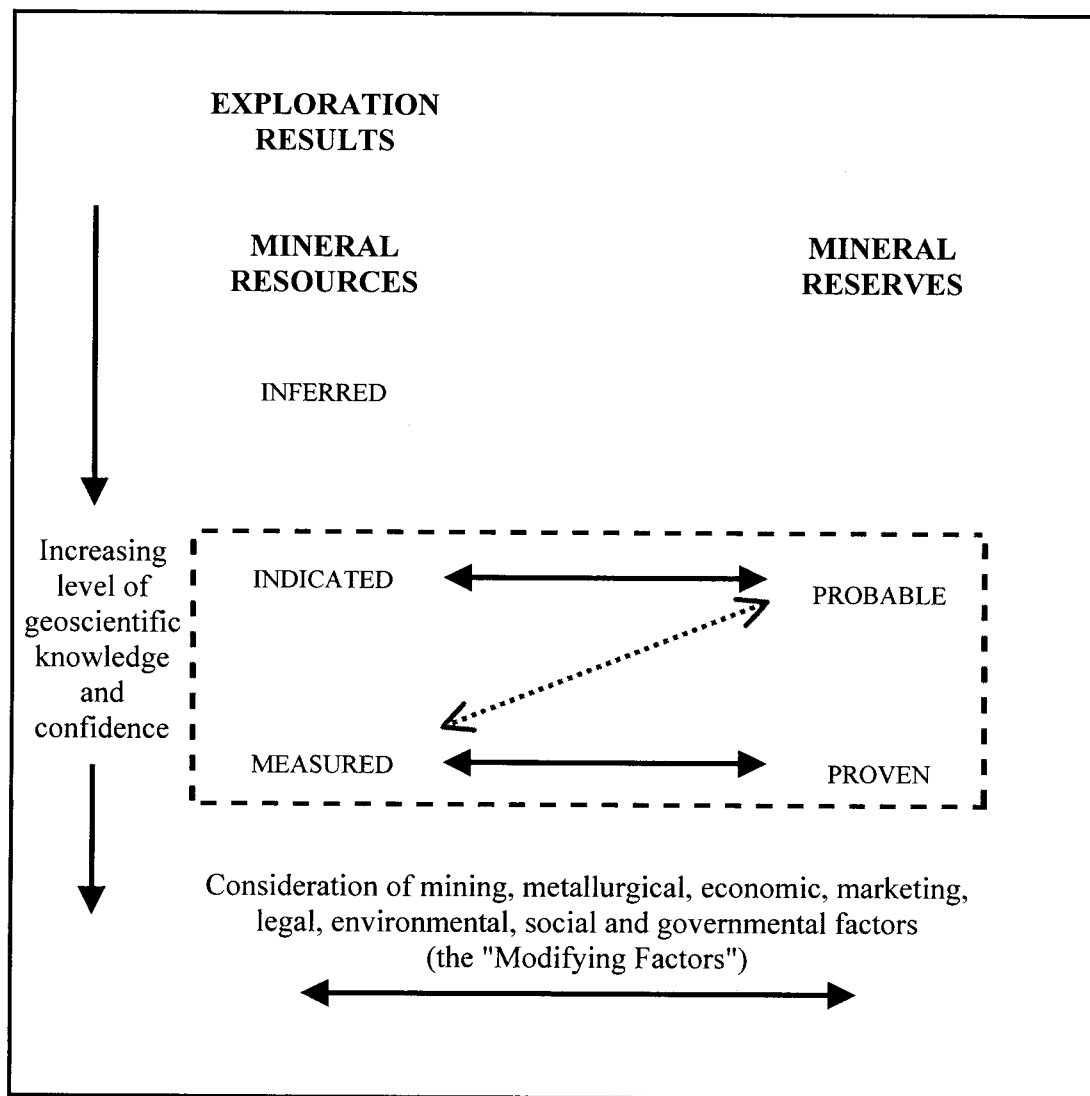
Figure 1 sets out the framework for classifying exploration results, tonnage and grade estimates and contained or recoverable minerals as applicable. This classification reflects different levels of geoscientific knowledge and different degrees of technical and economic evaluation. Mineral Resources can be estimated mainly on the basis of geoscientific information with some input from other disciplines. Mineral Reserves, which are a modified sub-set of the Indicated and Measured Mineral Resources, require consideration of those factors affecting extraction, including mining, metallurgical, economic, marketing, legal, environmental, social and governmental factors, and should in most instances be estimated with input from a range of disciplines.

In certain situations, Measured Mineral Resources could convert to Probable Mineral Reserves rather than to Proven Mineral Reserves because of uncertainties associated with modifying factors which are taken into account in the conversion from Mineral Resources to Mineral Reserves. This relationship is shown by the broken arrow in Figure 1. In such situations, these modifying factors should be fully explained.

In certain situations, previously reported Mineral Reserves could convert back to Mineral Resources because of new information according to which a Mineral Reserve can no longer be reported. The

resulting two-way relationship is shown by the two-headed arrows in Figure 1. The modifying factors which resulted in reclassification of a Mineral Reserve should be fully explained.

Figure 1 – General Relationship between Exploration Results, Mineral Resources and Mineral Reserves



Public Reporting – General

13. Public Reports concerning an entity's Exploration Results, Mineral Resources or Mineral Reserves should include a description of the style and nature of mineralization.

14. An entity must disclose relevant information concerning the status and characteristics of a mineral deposit which could materially influence the economic value of that deposit. To meet disclosure obligations, an entity may be required to promptly report any material changes in its Mineral Resources or Mineral Reserves.
15. An entity must review and publicly report on its Mineral Resources and Mineral Reserves at least annually.
16. Throughout the Guide, where appropriate, “quality” may be substituted for “grade” and “volume” may be substituted for “tonnage”.
17. Units used for reporting Mineral Resources or Mineral Reserves should be those generally applicable within the industry and within the jurisdiction where reporting takes place, for the mineral being reported.

Reporting of Exploration Results

18. **‘Exploration Results’ include data and information generated by exploration programs that may be of use to investors. The Exploration Results may or may not be part of a formal declaration of Mineral Resources or Mineral Reserves.**

The reporting of such information is common in the early stages of exploration when the quantity of data available is generally not sufficient to allow any reasonable estimates of Mineral Resources.

If an entity reports Exploration Results in relation to mineralization not classified as a Mineral Resource or a Mineral Reserve, then estimates of tonnages and average grade must not be assigned to the mineralization unless the situation is covered in Clause 20 below, and then only in strict accordance with the requirements of that clause.

Examples of Exploration Results include results of outcrop sampling, assays of drill hole intercepts, geochemical results and geophysical survey results.

19. Public reports of Exploration Results must contain sufficient information to allow a considered and balanced judgment of their significance. Reports must include relevant information such as exploration context, type and method of sampling, sampling intervals and methods, relevant sample locations, distribution, dimensions and relative location of all relevant assay data, data aggregation methods, land tenure status plus information on any of the other criteria listed in Table 1 that are material to an assessment.

Public reports of Exploration Results must not be presented so as to unreasonably imply that potentially economic mineralization has been discovered. If true widths of mineralization are not reported, an appropriate qualification must be included in the public report.

Where assay and analytical results are reported, they must be reported using one of the following methods, selected as the most appropriate by the Competent Person:

- Either by listing all results, along with sample intervals (or size, in the case of bulk samples), or
- By reporting weighted average grades of mineralized zones, indicating clearly how the grades were calculated.

Reporting of selected information such as isolated assays, isolated drill holes, assays of panned concentrated or supergene enriched soils or surface samples, without placing them in perspective is unacceptable.

Table 1 is a check list and guideline to which those preparing reports on Exploration Results, Mineral Resources and Mineral Reserves should refer. The check list is not prescriptive and, as always, relevance and materiality are overriding principles which determine what information should be publicly reported.

20. It is recognized that it is common practice for a company to comment on and discuss its exploration in terms of target size and type. Any such information relating to exploration targets must be expressed so that it cannot be misrepresented or misconstrued as an estimate of Mineral Resources or Mineral Reserves. The terms Resource or Reserve must not be used in this context. Any statement referring to potential quantity and grade of the target must be expressed as ranges and must include (1) a detailed explanation of the basis of the statement, and (2) a proximate statement that the potential quantity and grade is conceptual in nature, that there has been insufficient information to define a Mineral Resource and that it is uncertain if further exploration will result in the determination of a Mineral Resource.

Reporting of Mineral Resources

21. A **‘Mineral Resource’** is a concentration or occurrence of material of economic interest in or on the Earth’s crust in such form, quantity, and quality that there are reasonable prospects for eventual economic extraction. The location, quantity, grade, geological characteristics and continuity of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge. Mineral Resources are sub-divided, in order of increasing geological confidence, into Inferred, Indicated and Measured categories.

Portions of a deposit that do not have reasonable prospects for eventual economic extraction must not be included in a Mineral Resource.

The term “Mineral Resource” covers mineralization (including, in certain instances, dumps and tailings) which has been identified within reasonable limits and estimated through exploration and sampling and within which Mineral Reserves may be defined by the consideration and application of Modifying Factors.

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The term "reasonable prospects for eventual economic extraction" implies a judgment (albeit preliminary) by the Competent Person with respect to the technical and economic factors likely to influence the prospect of economic extraction, including the approximate mining parameters. In other words, a Mineral Resource is not an inventory of all mineralization drilled or sampled, regardless of cutoff grade, likely mining dimensions, location, or continuity. It is a realistic inventory of mineralization which, under assumed and justifiable technical and economic conditions, might become economically extractable.

The term "reasonable prospect" implies that Measured, Indicated, and Inferred Mineral Resources are constrained within pit shells or cones for open pit mines, or constrained to coherent zones which support mining, processing and development cost estimates for underground extraction. A deposit model is required, which may be a computer-generated block model or a model based on cross- or long-sections. Economic tests should be documented in technical studies, but the disclosure of resources should not require formal detailed technical and economic studies such as those required for reserve disclosure. Economic criteria should be applied equally to all categories of resources (Measured, Indicated and Inferred).

When publishing Mineral Resources, a statement should be made that, while the estimate of Mineral Resources is based on the Competent Person's judgment that there are reasonable prospects for eventual economic extraction, no assurance can be given that Mineral Resources will eventually convert to Mineral Reserves. Consideration should also be given to publication of the reasons why a reported Mineral Resource was not reported as a Mineral Reserve.

Commodity prices used in resource reporting should be based on the company's long-term view of the likely range of commodity prices. If prices used for resource estimation differ from the company's long term view as used for reserve reporting, these differences should be documented and justified.

Publication of Mineral Resources is recommended but not required. It is also recommended that, when publicly disclosing mineral resources, material assumptions made to estimate these resources are also disclosed. This may include disclosure of commodity price assumptions to the extent that this is customary and does not place the company at a competitive disadvantage. It is recognized that in some cases, such as when a product is sold under long term contract whose terms must be kept confidential, there might be valid commercial reasons for non-disclosure. There are also circumstances where disclosure of long term price assumptions used for business planning and reserve reporting can be detrimental to the company, such as when bidding for sales contracts or property acquisition. If prices are not published, the reasons for doing so must be documented. This documentation may be treated as confidential but should be available for review by auditors or regulators when required.

Cutoff grades or other quality parameters determined by the Competent Person should be used to exclude material for which there is no reasonable prospect for eventual economic extraction. Mineral Resource estimates may include material below the selected cutoff grade to ensure that the Mineral Resources comprise bodies of mineralization of adequate size and continuity to show reasonable prospects for eventual application of a feasible mining method.

Where considered appropriate by the Competent Person, the confidence in estimates of tonnage, grade, quality, physical characteristics and deleterious elements that may affect the ability to recover, beneficiate or produce a saleable product must be considered in determining whether a resource can be reported and in classifying the resource as Inferred, Indicated or Measured

All material assumptions made in determining the reasonable prospects for eventual economic extraction must be documented and justified.

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Interpretation of the word "eventual" in this context may vary depending on the commodity or mineral involved. For example, for some coal, iron ore, bauxite and other bulk minerals or commodities, it may be reasonable to envisage eventual economic extraction as covering time periods in excess of 50 years. For many gold deposits, application of the concept would normally be restricted to much shorter periods of time, but for Witwatersrand gold deposits long periods do apply. Interpretation is the responsibility of the Competent Person.

Any adjustment made to the data for the purpose of making the Mineral Resource estimate, for example by cutting or factoring grades, should be clearly documented and justified.

Certain reports (e.g., inventory reports, exploration reports to a government and other similar reports not intended primarily for providing information for investment purposes) may require full disclosure of all mineralization, including some material that does not have reasonable prospects for eventual economic extraction. Such estimates of mineralization would not qualify as Mineral Resources by this definition.

Mineralized stope fill, mineralized in situ remnants, shaft and stope pillars left for ground support purposes, and stockpiles of mineralized material, old dumps and tailings can be considered when reporting Mineral Resources if they present reasonable prospects for eventual economic extraction.

22. An **'Inferred Mineral Resource'** is that part of a Mineral Resource for which the overall tonnages, grades and mineral contents can be estimated with a reasonable level of confidence. It is based on geological evidence and apparent geological and grade continuity after applying economic parameters. It is derived from information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes, and which in some way is limited or of uncertain quality and reliability. An Inferred Mineral Resource has a lower level of confidence than that applying to an Indicated Mineral Resource.

The term 'overall' means within that part of the deposit for which Measured, Indicated and Inferred Mineral Resources are reported.

The category is intended to cover situations where a mineral concentration or occurrence has been identified and limited measurements and sampling completed, but the data are sufficient to allow the inference of geological and grade continuity. Commonly, it would be reasonable to expect that the majority of Inferred Mineral Resources would upgrade to Indicated or Measured Mineral Resource with continued exploration/delineation drilling or other sampling. However, due to the uncertainty of Inferred Mineral Resources it should not be assumed that such upgrading will always occur.

Confidence in the estimate is sufficient to allow the application of assumed but not verified technical and economic parameters for conceptual planning. However, confidence is usually not sufficient to allow the results of the application of these technical and economic parameters to be used for incremental planning and production scheduling. For this reason, there is no direct link from an Inferred Mineral Resource to any category of Mineral Reserves (see Figure 1). Caution should be exercised if this category is considered in technical or economic studies.

Inferred Mineral Resources should exclude material for which there is insufficient data to allow the inference of geological or grade continuity. Inferred Mineral Resources are intended to be sufficiently

defined that overall tonnages, grades and mineral contents can be estimated with a reasonable level of confidence.

23. An **‘Indicated Mineral Resource’** is that part of a Mineral Resource for which overall tonnages, densities, shapes, physical characteristics, grades and mineral contents can be estimated with high levels of confidence, and local tonnages, densities, shapes, physical characteristics, grades and mineral contents can be estimated with reasonable levels of confidence. An Indicated Mineral Resource is based on exploration, sampling and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings, and drill holes. The locations are too widely or inappropriately spaced to confirm geological continuity and grade continuity but are spaced closely enough for continuity to be assumed. An Indicated Mineral Resource has a lower level of confidence than that applying to a Measured Mineral Resource, but has a higher level of confidence than that applying to an Inferred Mineral Resource.

The term ‘overall’ means within that part of the deposit for which Measured, Indicated and Inferred Mineral Resources are reported. The term ‘local’ means within selected parts of the deposit related to mining increments which are suitable for development of mine plans and financial analyses.

A deposit or part of a deposit may be classified as an Indicated Mineral Resource when the nature, quality, amount and distribution of data are such as to allow the Competent Person determining the Mineral Resource to confidently interpret the geological framework and to assume continuity of mineralization. Confidence in the estimate is sufficient to allow the appropriate application of technical and economic parameters to prepare incremental plans and production schedules and to enable an evaluation of economic viability. Overall confidence in the estimates is high while local confidence is reasonable. The Competent Person must recognize the importance of the Indicated Mineral Resource category to the advancement of the feasibility of the project. An Indicated Mineral Resource estimate is of sufficient quality to support detailed technical and economic studies leading to a Mineral Reserves Declaration Report which can serve as the basis for major development decisions.

24. A **‘Measured Mineral Resource’** is that part of a Mineral Resource for which both overall and local tonnages, densities, shapes, physical characteristics, grades and mineral contents can be estimated with a high level of confidence. It is based on detailed and reliable exploration, sampling and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings, and drill holes. The locations are spaced closely enough to confirm geological and grade continuity.

The term ‘overall’ means within that part of the deposit for which Measured, Indicated and Inferred Mineral Resources are reported. The term ‘local’ means within selected parts of the deposit related to mining increments which are suitable for development of mine plans and financial analyses.

A deposit or part of a deposit may be classified as a Measured Mineral Resource when the nature, quality, amount and distribution of data are such as to leave no reasonable doubt, in the opinion of the

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Competent Person determining the Mineral Resource, that the tonnage and grade of production planning and scheduling increments can be estimated within close limits and that any variation from the estimate would not significantly affect potential economic viability of individual increments. This category requires a high level of confidence in, and understanding of, the geology and controls of the mineral deposit. A Measured Mineral Resource estimate is of sufficient quality to support detailed technical and economic studies leading to a Mineral Reserves Declaration Report which can serve as the basis for major development decisions.

25. The choice of the appropriate category of Mineral Resource depends upon the quantity, distribution and quality of data available, the level of confidence that attaches to those data, and the appropriateness of the estimation methodology applied. The appropriate Mineral Resource category must be determined by the Competent Person.

Mineral Resource classification is a matter for skilled judgment and the Competent Person should take into account those items in Table 1 which relate to confidence in Mineral Resource estimation.

In deciding between Measured Mineral Resource and Indicated Mineral Resource, the Competent Person may find it useful to consider, in addition to the phrases relating to geological and grade continuity in Clauses 25 and 26, the phrase in the guideline to the definition for Measured Mineral Resource: "... any variation from the estimate would not significantly affect potential economic viability of individual increments".

In deciding between Indicated Mineral Resource and Inferred Mineral Resource, the Competent Person may wish to take into account, in addition to the phrases relating to geological and grade continuity in Clauses 25 and 26, the guideline to the definition for Indicated Mineral Resource: "Confidence in the estimate is sufficient to allow the appropriate application of technical and economic parameters to prepare incremental plans and production schedules and to enable an evaluation of economic viability", which contrasts with the guideline to the definition for Inferred Mineral Resource: "Confidence in the estimate is sufficient to allow the application of assumed but not verified technical and economic parameters for conceptual planning. However, confidence is usually not sufficient to allow the results of the application of [these] parameters to be used for incremental planning and production scheduling... Caution should be exercised if this category is considered in technical or economic studies".

26. Mineral Resource estimates are not precise calculations, being dependent on the interpretation of limited information on the location, shape and continuity of the occurrence and on the available sampling results. Reporting of tonnage and grade figures should reflect the order of accuracy of the estimate by rounding off to appropriately significant figures and by qualification with terms such as 'approximately'.

Depending on the accuracy of the estimate, rounding to the second or third significant figure should be sufficient. For example, 10,863,425 tons at 8.23 per cent could be stated as 11 million tons at 8.2 percent or 10.9 million tons at 8.23 percent. In order to emphasize the imprecise nature of a Mineral Resource or Mineral Reserve estimate, it is recommended that the final result always be referred to as an estimate not a calculation.

Competent Persons are encouraged, where appropriate, to discuss the relative accuracy and/or confidence of the Mineral Resource estimates. The statement should specify whether it relates to overall or local estimates, and, if local, state the relevant tonnage or volume. Where a statement of the

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relative accuracy and/or confidence is not possible, a qualitative discussion of the uncertainties should be provided.

27. Mineral Resource reports must specify one or more of the categories of “Inferred”, “Indicated” and “Measured”. Reports must not contain Inferred Mineral Resource figures combined with either of the other two categories. The Measured and Indicated categories can be combined only if also reported separately. A Mineral Resource must not be reported in terms of contained metal unless corresponding tonnage and grade figures are also presented. Mineral Resource figures must not be aggregated with Mineral Reserve figures.

In situations where both Mineral Resource and Mineral Reserve figures are reported (such as tonnage, grade, mineral content), the Mineral Resource figures must not include any material reported as a Mineral Reserve.

28. Table 1 provides, in a summary form, a list of the main criteria which should be considered when preparing reports on Exploration Results, Mineral Resources and Mineral Reserves. These criteria need not be discussed in a public report unless they materially affect estimation or classification of the Mineral Resources.

It is not necessary, when publicly reporting, to comment on each item in Table 1, but it is essential to discuss any matters which might materially affect the reader's understanding or interpretation of the results or estimates being reported. This is particularly important where inadequate or uncertain data affect the reliability of, or confidence in, a statement of Exploration Results or an estimate of Mineral Resources and/or Mineral Reserves; for example, poor sample recovery, poor repeatability of assay or laboratory results, limited information on tonnage factors etc.

Mineral Resource estimates are sometimes reported after adjustment by cutting of high grades, the application of factors such as dilution, mine or mill “call factors”, and similar modifying factors. If any of the data are materially adjusted or modified for the purpose of making the estimate, this should be clearly stated in a public Mineral Resource report and the nature of the adjustment or modification described.

If there is doubt about what should be reported in order to ensure full disclosure, it is better to err on the side of providing too much information rather than too little.

29. The words ‘ore’ and ‘reserves’ must not be used in stating Mineral Resource estimates as the terms imply technical feasibility and economic viability and are only appropriate when all relevant mining, metallurgical, economic, marketing, legal, environmental, social and governmental factors have been considered. Reports and statements should continue to refer to the appropriate category or categories of Mineral Resources until technical feasibility and economic viability have been established. If re-evaluation indicates that the Mineral Reserves are no longer viable, the Mineral Reserves must be reclassified as Mineral Resources or removed from Mineral Resource/Mineral Reserve statements altogether.

It is not intended that reclassification from Mineral Reserves to Mineral Resources should be applied as a result of changes expected to be of a short term or temporary nature, or where management has made a deliberate decision to operate on a non-economic basis. Examples of such situations might be

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a commodity price drop expected to be of short duration, mine emergency of a non-permanent nature, transport strike etc.

30. As a minimum, the Competent Person should review Mineral Resource supporting documents on an annual basis. Reports must be updated if there are significant changes in technical and economic parameters.

If such review results in material changes in, or reclassification of Mineral Resources, timely disclosure may be required.

Reporting of Mineral Reserves

31. A **‘Mineral Reserve’** is the economically mineable part of a Measured and/or Indicated Mineral Resource. It includes diluting materials and allowances for losses which may occur when the material is mined. Appropriately detailed assessments and studies have been carried out and include consideration of and modification by realistically assumed mining, metallurgical, economic, marketing, legal, environmental, social and governmental factors. These assessments demonstrate at the time of reporting that extraction could reasonably be justified. Mineral Reserves are sub-divided in order of increasing confidence into Probable Mineral Reserves and Proven Mineral Reserves.

Before a Mineral Reserve is publicly reported, a Mineral Reserves Declaration Report must be prepared as defined later in this Guide. This report must contain a description of the appropriately detailed assessments and studies that have been carried out to demonstrate that extraction could reasonably be justified.

Mineral Reserves are those portions of Mineral Resources which, after the application of all mining factors, result in an estimated tonnage and grade which, in the opinion of the Competent Person making the estimates, can be the basis of a viable project after taking account of all relevant mining, metallurgical, economic, marketing, legal, environmental, social and governmental factors. Mineral Reserves are inclusive of diluting material which will be mined and delivered to the treatment plant or equivalent.

The term “economic” implies that extraction of the Mineral Reserve has been established or analytically demonstrated to be viable and justifiable under reasonable investment and market assumptions. The term “Mineral Reserve” need not necessarily signify that extraction facilities are in place or operative or that all governmental approvals have been received. It does signify that there are reasonable expectations of timely approvals.

It should be noted that the Guide does not imply that an economic operation must have Proven Mineral Reserves. Situations arise where Probable Mineral Reserves alone may be sufficient to justify extraction, as for example with some alluvial tin or gold deposits. This is a matter for judgment by the Competent Person and the management of the entity owning the information.

The terms “Ore Reserves” and “Mineral Reserves” can be used interchangeably where it is customary to do so, usually for metallic deposits and some industrial minerals.

Public disclosure of Mineral Reserves is allowed only after completion of a Mineral Reserves Declaration Report as defined later in this Guide.

32. A **'Probable Mineral Reserve'** is the economically mineable part of an Indicated and, in some circumstances, Measured Mineral Resource. It includes diluting materials and allowances for losses which may occur when the material is mined. Appropriate assessments and studies have been carried out, and include consideration of and modification by realistically assumed mining, metallurgical, economic, marketing, legal, environmental, social and governmental factors. These assessments demonstrate at the time of reporting that extraction could reasonably be justified.

A Probable Mineral Reserve has a lower level of confidence than a Proven Mineral Reserve but is of sufficient quality to serve as the basis for a decision on the development of the deposit.

33. A **'Proven Mineral Reserve'** is the economically mineable part of a Measured Mineral Resource. It includes diluting materials and allowances for losses which may occur when the material is mined. Appropriately detailed assessments and studies have been carried out and include consideration of and modification by realistically assumed mining, metallurgical, economic, marketing, legal, environmental, social and governmental factors. These assessments demonstrate at the time of reporting that extraction is reasonably justified.

A Proven Mineral Reserve represents the highest confidence category. The style of mineralization or other factors could mean that a Proven Mineral Reserve cannot be demonstrated in some deposits. Competent Persons should be aware of the consequences of declaring a Proven Mineral Reserve before satisfying themselves that all of the relevant resource parameters and modifying factors have been established at a similarly high level of confidence. Subsequent retraction of a publicly reported Proven Mineral Reserve can lead to investor uncertainty and lack of corporate confidence.

34. The choice of the appropriate category of Mineral Reserve is determined primarily by the classification of the corresponding Mineral Resource and after considering any uncertainties in the modifying factors. Allocation to the appropriate category must be made by the Competent Person.

The Guide provides for a direct relationship between Indicated Mineral Resources and Probable Mineral Reserves and between Measured Mineral Resources and Proven Mineral Reserves. In other words, the level of geoscientific confidence for Probable Mineral Reserves is the same as that required for the determination of Indicated Mineral Resources and for Proven Reserves is the same as that required for the determination of Measured Mineral Resources.

The Guide provides for a two-way relationship between Measured Mineral Resources and Probable Mineral Reserves. This is to cover the situation where uncertainties associated with any of the modifying factors considered when converting Mineral Resources to Mineral Reserves may result in there being a lower degree of confidence in the Mineral Reserves than in the corresponding Mineral Resources.

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If the uncertainties in the modifying factors that prevented the Measured Mineral Resource being converted to a Proven Mineral Reserve are removed, then the Measured Mineral Resource may be converted to a Proven Mineral Reserve. No amount of confidence in the modifying factors for conversion of a Mineral Resource into a Mineral Reserve can override the upper level of confidence which exists in the Mineral Resource. Under no circumstances can an Indicated Mineral Resource be converted to a Proven Mineral Reserve, unless new information first justifies conversion to a Measured Mineral Resource. Under no circumstances can an Inferred Mineral Resource be converted to a Mineral Reserve unless first converted to an Indicated or Measured Mineral Resource.

Application of the category of a Proven Mineral Reserve implies the highest degree of confidence in the estimate.

Refer also to corresponding Clause in this Guide regarding classification of Mineral Resources.

35. Mineral Reserve estimates are not precise calculations. Tonnage and grade figures in reports should be expressed so as to convey the order of accuracy of the estimates by rounding off to appropriately significant figures.

To emphasize the imprecise nature of a Mineral Reserve the final result should always be referred to as an estimate, not a calculation.

Competent Persons are encouraged, where appropriate, to discuss the relative accuracy and/or confidence of the Mineral Reserve estimates. The statement should specify whether it relates to overall or local estimates, and, if local, state the relevant tonnage or volume. Where a statement of the relative accuracy and/or confidence is not possible, a qualitative discussion of the uncertainties should be provided.

Depending on the accuracy of the estimate, rounding to the second or third significant figure should be sufficient. For example, 10,863,425 tons at 8.23 per cent could be stated as 11 million tons at 8.2 percent or 10.9 million tons at 8.23 percent. In order to emphasize the imprecise nature of a Mineral Resource or Mineral Reserve estimate, it is recommended that the final result always be referred to as an estimate not a calculation.

36. Mineral Reserve reports must specify one or both of the categories of 'Proven' and 'Probable'. Reports that combine Proven and Probable Mineral Reserve figures must provide estimates for each category if this information is material. Reports must not present contained metal figures unless corresponding tonnage and grade figures are also presented.
37. When reporting a Mineral Reserve, tonnages, grades and mineral or metal contents must be reported after taking into account mining loss and mining dilution. Metal contents can be reported after also taking into account processing recoveries. If processing recoveries are not taken into account, the percentage expected to be recovered or lost during processing must be reported.
38. In situations where figures for both Mineral Resources and Mineral Reserves are reported, a clarifying statement must be included in the report which clearly indicates that the Mineral Resources do not include any material reported as Mineral Reserves.

An appropriate form of clarifying statement may be:

"The Mineral Resources do not include material reported as Mineral Reserves."

It is strongly recommended that, if there is a significant difference between a Mineral Reserve and the Mineral Resource from which this Mineral Reserve was estimated, an explanation of the reasons for the difference should be included in the report. This will assist the reader of the report in making a judgment of the likelihood of the remaining Mineral Resources eventually being converted to Mineral Reserves.

When converting Mineral Resources to Mineral Reserves, Mineral Reserves may incorporate material (dilution) which may not have been included in the original Mineral Resource. This fundamental difference between Mineral Resources and Mineral Reserves should be explained if of material significance.

Remaining Mineral Resources must be reported separately from Mineral Reserves because the resulting total may be very misleading in economic terms and may be misunderstood or, more seriously, misused to give a false impression of the prospectivity of a project.

Public reporting of tonnage and grade estimates other than Mineral Resources and Mineral Reserves is not permitted under the Guide. Other estimates may be useful for an entity in its internal calculations and evaluation processes, but their inclusion in public reports could cause confusion.

In preparing the Mineral Reserve statement, the relevant Mineral Resource statement on which it is based should first be developed. This should be reconciled with the Mineral Resource statement estimated for the previous comparable period and differences (due, for example, to mine production, exploration, etc.) identified. The application of appropriate factors to the Mineral Resource can then be made to develop the Mineral Reserve statement which can also be reconciled with the previous comparable Mineral Reserve statement. Mining companies are encouraged to reconcile estimates whenever possible in their reports. A detailed account of differences between Mineral Reserves and corresponding Mineral Resource figures is not essential, but sufficient comment should be made to enable significant variances to be understood by the reader.

Mineral Reserve estimates are sometimes reported after adjustment by cutting of high grades, the application of factors such as dilution, mine or mill "call factors", and similar modifying factors. If any of the data are materially adjusted or modified for the purpose of making the estimate, this should be clearly stated in a public Mineral Reserve report and the nature of the adjustment or modification described.

39. As a minimum, the Competent Person should review Mineral Resource and Mineral Reserve supporting documents on an annual basis. Reports must be updated if there are significant changes in technical and economic parameters.

If such review results in material changes in, or reclassification of Mineral Resources, timely disclosure may be required. In operating mines, reconciliation reports which compare mined resources and reserves with actual production, should be reviewed annually.